FIG. 1

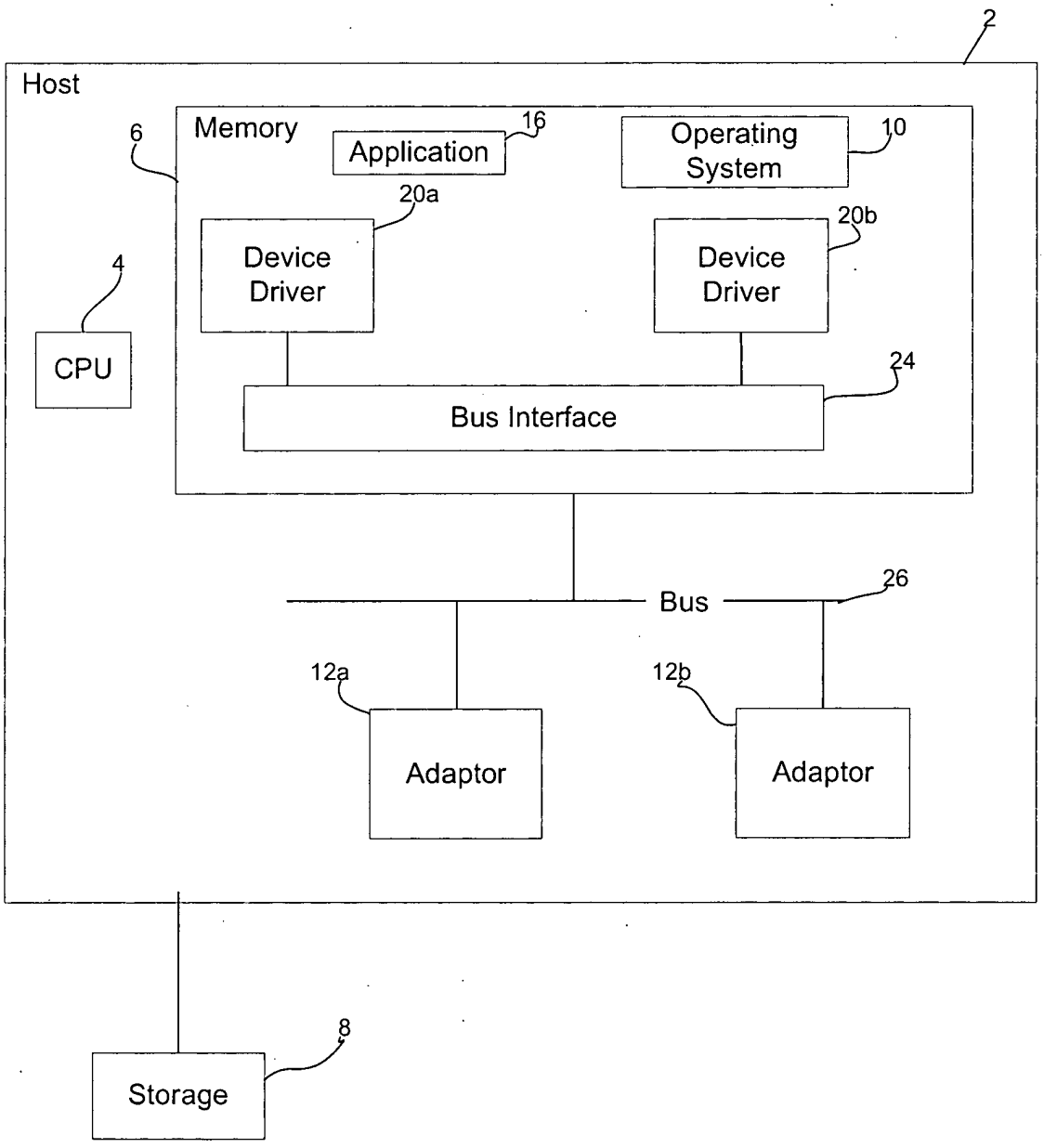

2
Host
6
Memory
Application
16
Operating System
10
20a
Device Driver
20b
Device Driver
4
CPU
24
Bus Interface
Bus
26
12a
12b
Adaptor
Adaptor
8
Storage

FIG. 2

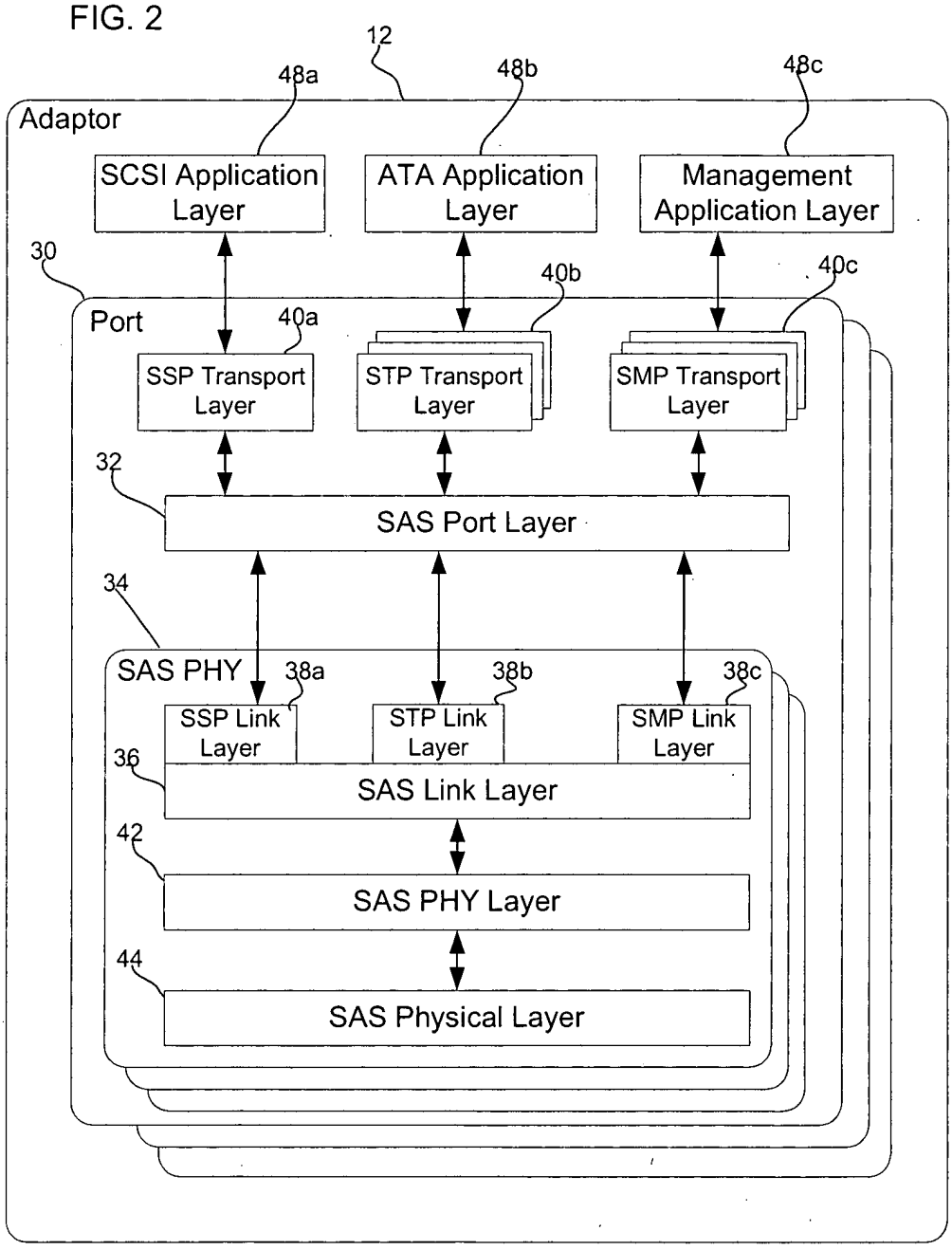
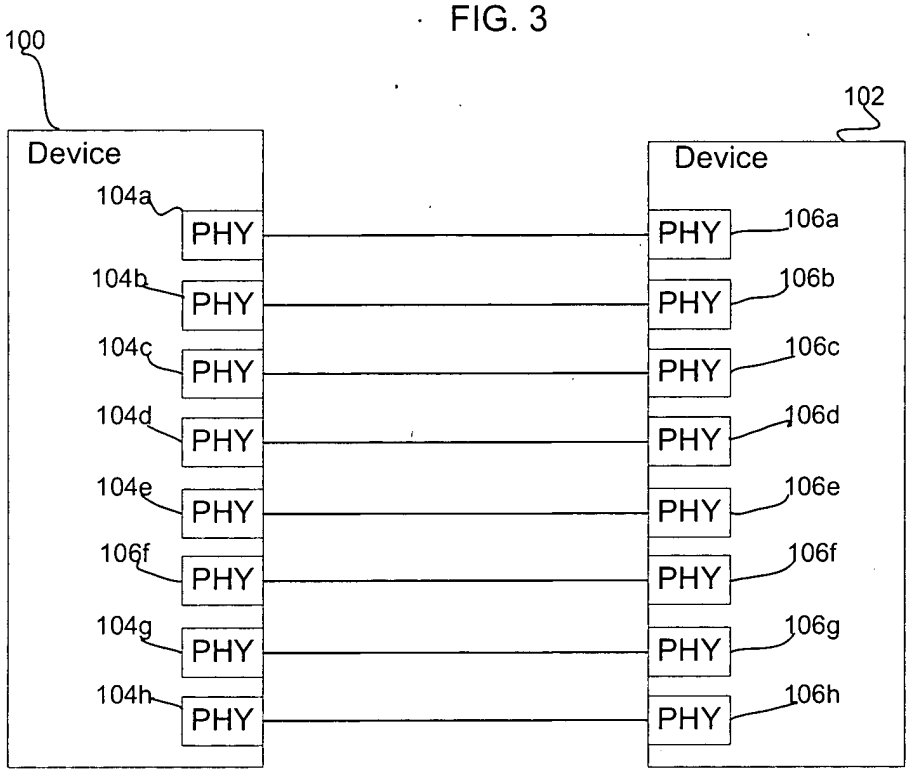

12
48a
48b
48c
Adaptor
SCSI Application Layer
ATA Application Layer
Management Application Layer
30
40b
40c
Port
40a
SSP Transport Layer
STP Transport Layer
SMP Transport Layer
32
SAS Port Layer
34
SAS PHY
38a
38b
38c
SSP Link Layer
STP Link Layer
SMP Link Layer
36
SAS Link Layer
42
SAS PHY Layer
44
SAS Physical Layer

FIG. 3


100
102
Device
Device
104a
PHY
106a
PHY
104b
PHY
106b
PHY
104c
PHY
106c
PHY
104d
PHY
106d
PHY
104e
PHY
106e
PHY
106f
PHY
106f
PHY
104g
PHY
106g
PHY
104h
PHY
106h
PHY

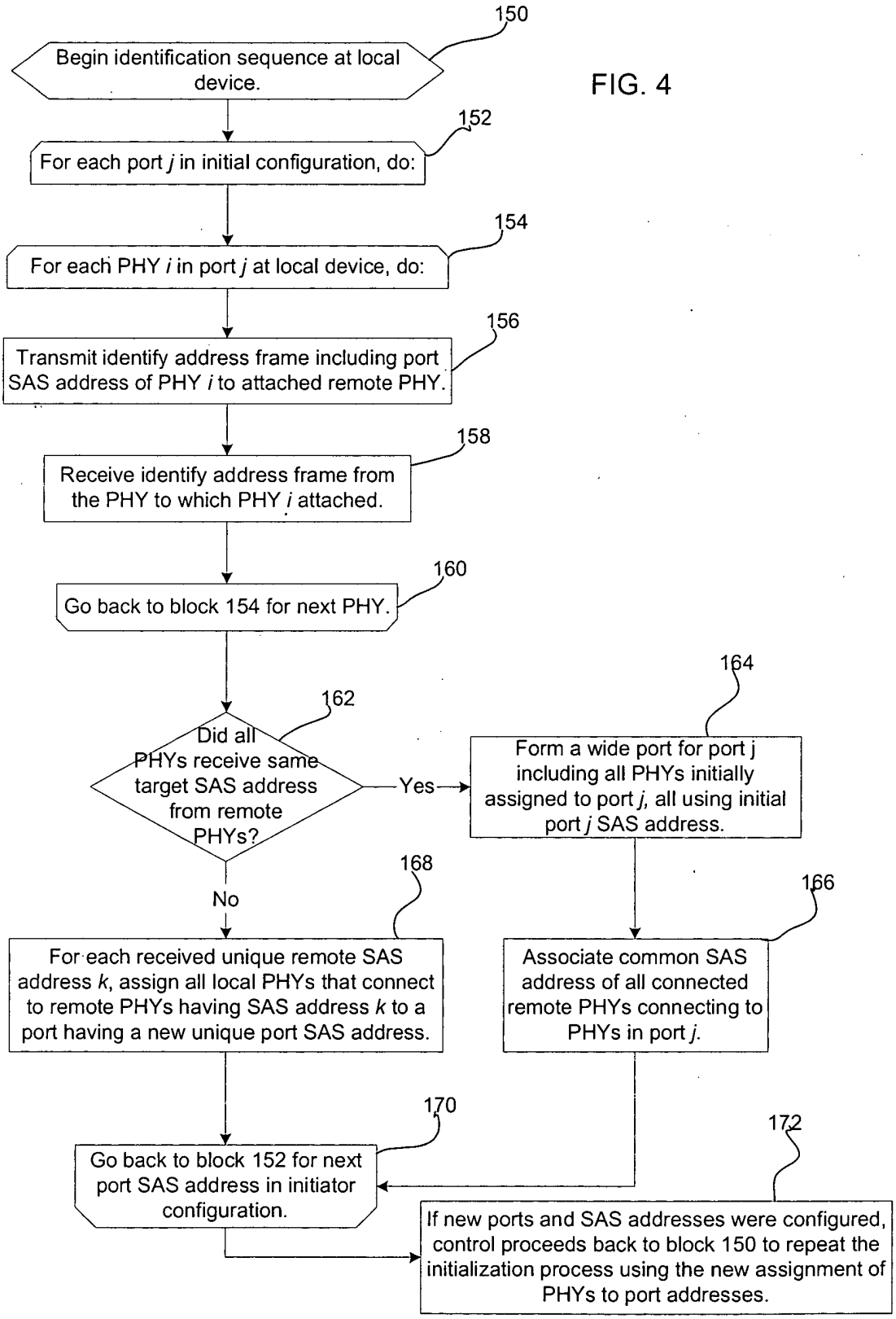

150
Begin identification sequence at local device.
152
For each port j in initial configuration, do:
154
For each PHY i in port j at local device, do:
156
Transmit identify address frame including port SAS address of PHY i to attached remote PHY.
158
Receive identify address frame from the PHY to which PHY i attached.
160
Go back to block 154 for next PHY.
162
Did all PHYs receive same target SAS address from remote PHYs?
Yes
164
Form a wide port for port j including all PHYs initially assigned to port j, all using initial port j SAS address.
No
168
For each received unique remote SAS address k, assign all local PHYs that connect to remote PHYs having SAS address k to a port having a new unique port SAS address.
166
Associate common SAS address of all connected remote PHYs connecting to PHYs in port j.
170
Go back to block 152 for next port SAS address in initiator configuration.
172
If new ports and SAS addresses were configured, control proceeds back to block 150 to repeat the initialization process using the new assignment of PHYs to port addresses.

FIG. 4

FIG. 5a

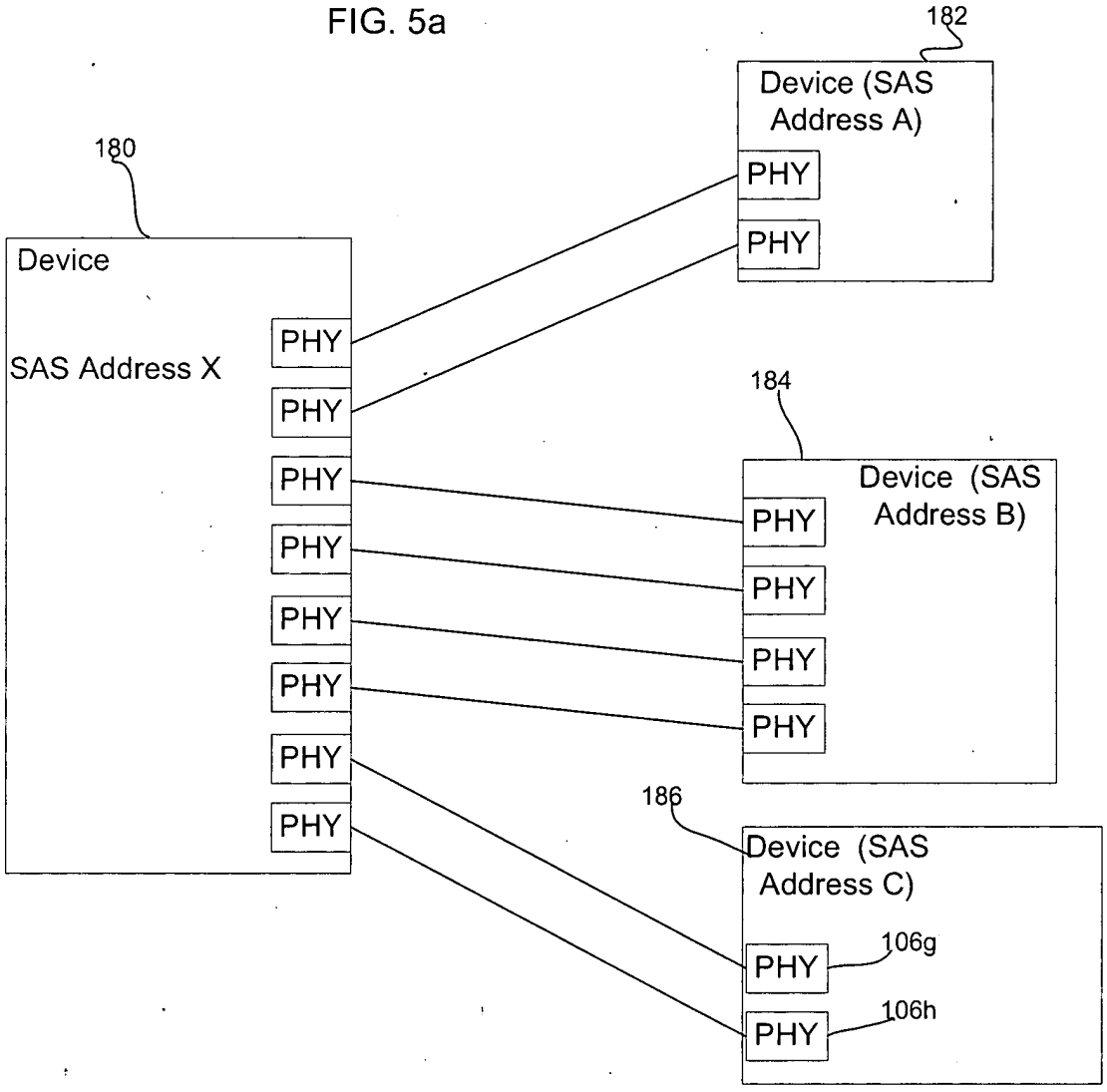
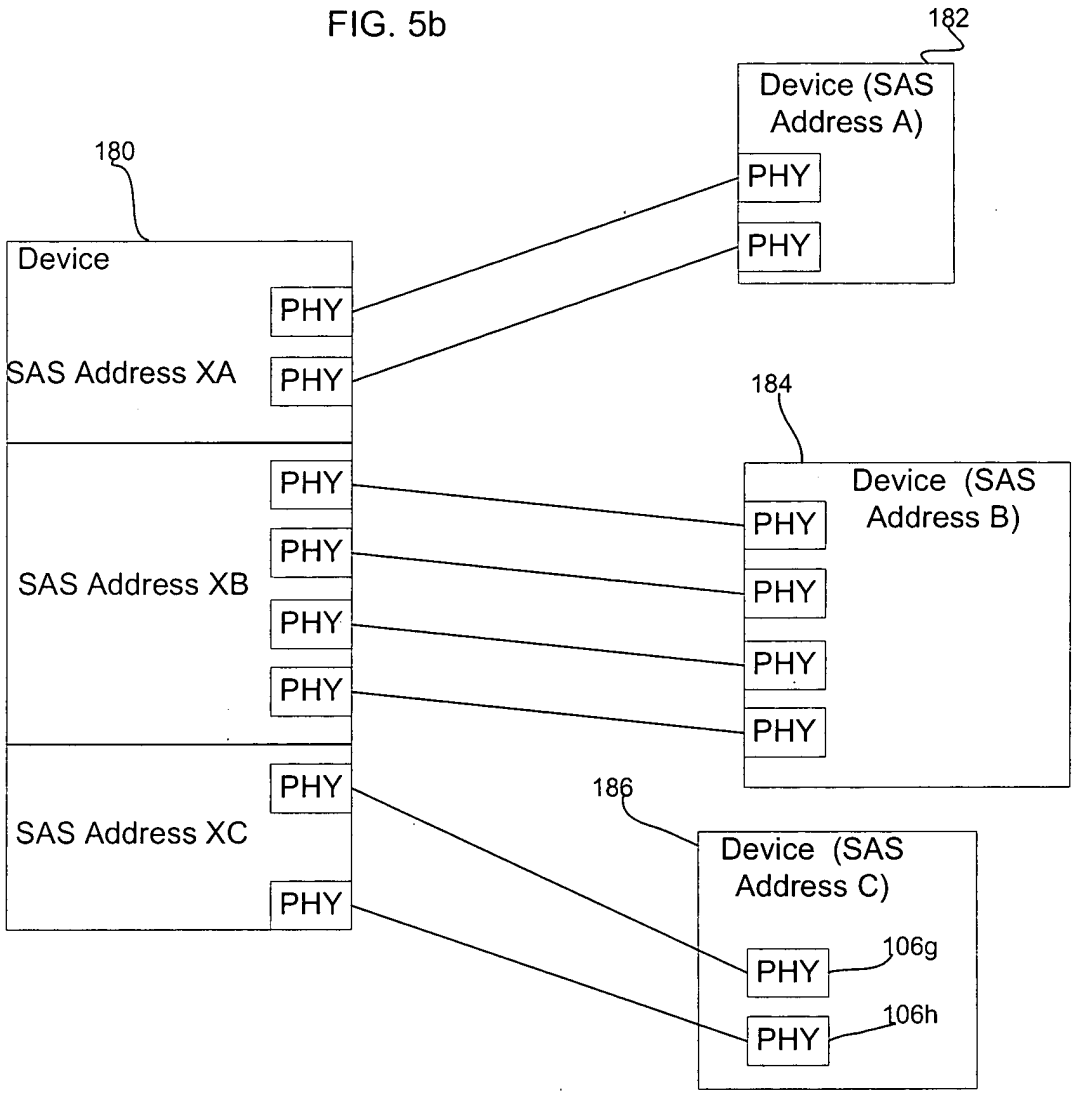

182
Device (SAS Address A)
PHY
PHY
180
Device
SAS Address X
PHY
PHY
PHY
PHY
PHY
PHY
PHY
PHY
184
Device (SAS Address B)
PHY
PHY
PHY
PHY
186
Device (SAS Address C)
PHY
106g
PHY
106h

FIG. 5b


182
Device (SAS Address A)
PHY
PHY
180
Device
PHY
SAS Address XA
PHY
184
PHY
Device (SAS Address B)
PHY
SAS Address XB
PHY
PHY
PHY
PHY
PHY
186
PHY
Device (SAS Address C)
SAS Address XC
PHY
106g
PHY
106h

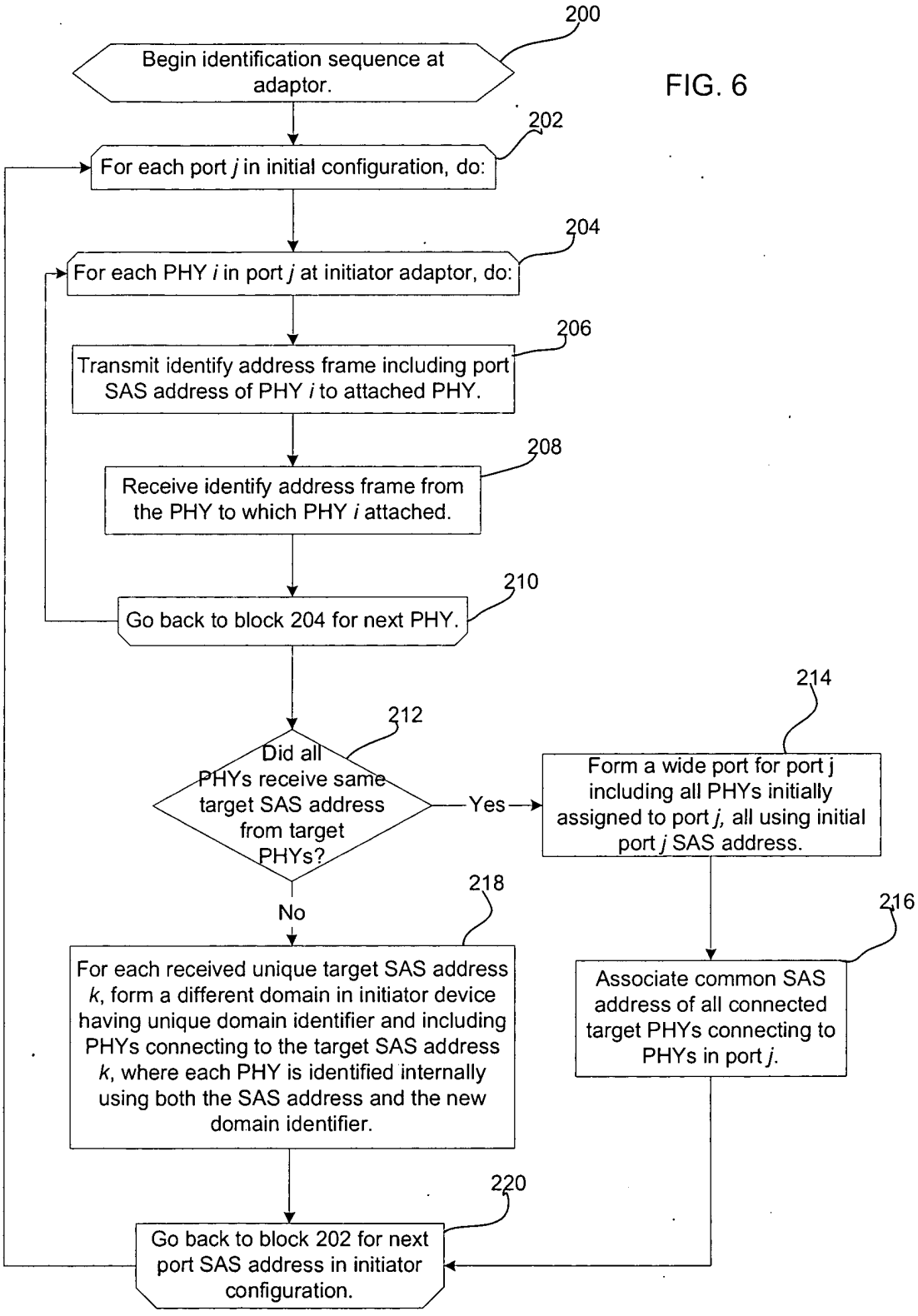
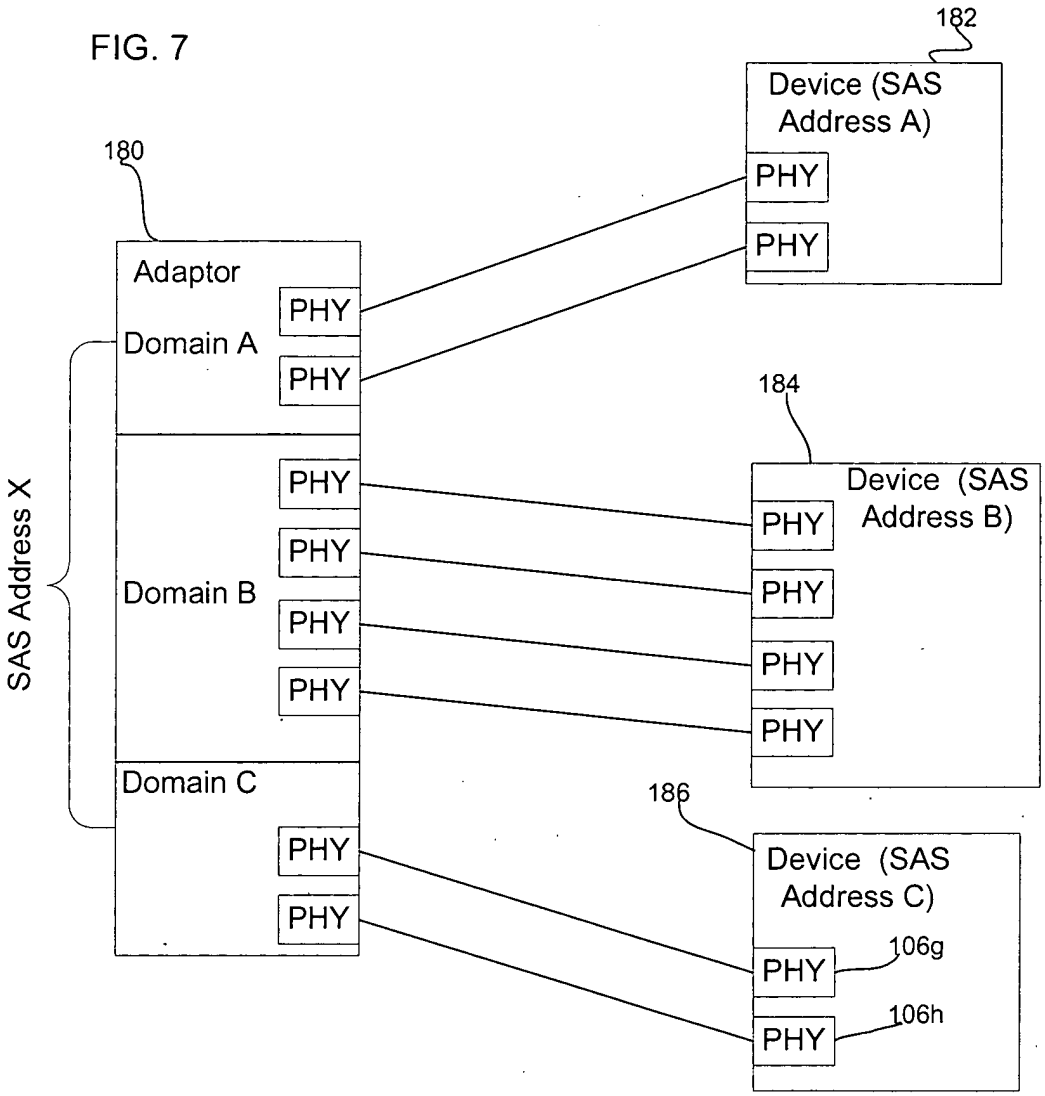

200
Begin identification sequence at adaptor.
202
For each port j in initial configuration, do:
204
For each PHY i in port j at initiator adaptor, do:
206
Transmit identify address frame including port SAS address of PHY i to attached PHY.
208
Receive identify address frame from the PHY to which PHY i attached.
210
Go back to block 204 for next PHY.
212
Did all PHYs receive same target SAS address from target PHYs?
Yes
214
Form a wide port for port j including all PHYs initially assigned to port j, all using initial port j SAS address.
No
218
For each received unique target SAS address k, form a different domain in initiator device having unique domain identifier and including PHYs connecting to the target SAS address k, where each PHY is identified internally using both the SAS address and the new domain identifier.
216
Associate common SAS address of all connected target PHYs connecting to PHYs in port j.
220
Go back to block 202 for next port SAS address in initiator configuration.

FIG. 6

FIG. 7


182
Device (SAS Address A)
PHY
PHY
180
Adaptor
Domain A
PHY
PHY
184
Device (SAS Address B)
PHY
PHY
PHY
PHY
PHY
PHY
PHY
PHY
SAS Address X
Domain B
Domain C
186
Device (SAS Address C)
PHY
PHY
106g
106h